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ABSTRACT

It is proposed that common variance among Factor V personality traits might best be modeled in terms of three broad and distinct subdomains one level below the superordinate level of the so-called Big Five. Three studies are reported that point toward this compromise conception of the top of Factor V as Absorption (A), Intellectance (I), and Traditionalism (T) (referred to as the AIT factors). Study 1 was a reanalysis of data from a larger study of the NEO Personality Inventory and Hogan Personality Inventory facet measures of Factor V for 581 undergraduates. Study 2 checked whether the AIT factors retained their integrity when conscientiousness and agreeableness scales were added to the analysis for a sample of 117 students. In Study 3, a slightly wider selection of AIT related scales were administered to 202 subjects. Evidence from these studies can be interpreted as arguing for splitting Factor V into three different factors and for extending the Big Five model to a Big Six or Big Seven. The correlations of A, I, and T with each other, and the impressive validity that has been established for the circumplex model of vocational interests both argue in favor of keeping Factor V with three subdomains. Six tables and four figures illustrate the discussion. An appendix lists the item content of AIT marker scales. Thirty-one references are included. (SLD)

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# Vocational Interests and the Facet Structure of Factor V

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Paper presented as part of the symposium Intellectance and openness in the "Big Five" personality structure (John F. Kihlstrom, Chair), at the Annual Convention of the American Psychological Association, August, 1992, Washington, D.C.

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In a recent conference paper the reluctant midwife or midperson of the Big Five, Lewis Goldberg, admitted the continuing disagreement over the meaning of the fifth Factor was "somewhat of a scientific embarrassment" (Goldberg, 1992). This symposium is, perhaps, one response to that embarrassment. Goldberg also observed that the hallmark of a compelling structural model is a general dislike for it that prompts numerous efforts to replace it---all of which fail. The three studies I'll report this morning were prompted by a general dislike for what appeared to be a "shot-gun wedding" of different personality factors in Costa & McCrae's openness model of Factor V. Unfortunately, the results were not as damaging to openness as I expected and at first glance appeared to qualify the effort for that growing pile of bombed Big Five attacks Goldberg was alluding to.

A second, more constructive interpretation of the results, however, is that together with the Glisky & Kihlstrom findings they suggest the possibility of a compromise among the views expressed this morning. Big Five defenders have grown weary in recent years of reminding Big Five consumers and critics that the model is a hierarchical one, and that the Big Five are not five traits but extremely broad rubrics for the very top of a hierarchical model of trait structure.

It is entirely consistent with this hierarchical view of the Big Five to propose broad, distinct subdomains within or below Big Five categories, subdomains conceptualized at a level higher in the hierarchy than Costa & McCrae's facet distinctions. In such a structural model correlations among subdomains need not be strong to postulate an even broader dimension linking them (e.g., a Big Five factor). Relations between subdomains need only be strong and reliable enough to prompt a need to describe and explain them.

With this in mind, it seems reasonable to propose that common variance among Factor V traits might be best modeled in terms of three broad, very distinct subdomains located one level below the superordinate level of the Big Five. An unraveling of Factor

V into three subdomains has at least two advantages. First, it might more readily accommodate the competing theoretical perspectives on Factor V--such as those articulated this morning by Dr.'s McCrae and Hogan. Secondly, and equally importantly it allows the standard Big Five model, in all its heuristic glory, to remain intact. This compromise model, which might be dubbed the "Kihlstrom compromise" in honor of the organizer of this first symposium on Factor V, may be preferable on both empirical and pragmatic grounds to expansions of the current model to a "Big Six" or Big Seven".

I'll briefly report results from three studies that, along with the evidence just reported by Martha Glisky, point in the direction of this compromise conception of the top of the "fifth". I will refer to these three broad Factor V sub-domains, as Martha Glisky and John Kihlstrom do, as Absorption (A), Intellectance (I) and Traditionalism (T), and to the three-domain model of Factor V itself as the "A-I-T" model, as indicated in Figure 1.

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Insert Figure 1 about here

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The point of departure for the three studies that follow is McCrae's (1990) argument for a less restrictive or "weak" form of the lexical hypothesis in defining the broad outlines of a trait taxonomy. A strong lexical view, according to McCrae, is one requiring a "rigorous parallelism" between factors obtained from lexical studies and hypothesized personality factors. McCrae and others reject this view as too restrictive a definition of personality structure because experiential and affective traits may be underrepresented among the single unit trait descriptive terms studied by lexically-oriented trait researchers (e.g., adjectives and nouns). Three considerations which are suggested by McCrae's alternative "weak" lexical view provide a rationale or point of departure for these three studies. The first consideration is that if longer language units such as phrases and sentences can sample experiential and affective dispositions

linked to Factor V more adequately than trait adjectives and nouns, then questionnaire data on the structure of Factor V should be systematically evaluated.

Secondly, however, the very flexibility and subtlety of longer language units that allows better measurement of experiential and affective traits may also render horizontal and vertical boundaries between trait constructs infinitely plastic. That plasticity, in turn, creates a "moving target" problem for inductive taxonomic methods such as factor analysis, rendering them useless. This fatal taxonomic flaw of the questionnaire domain necessitates some kind of temporary toehold in the lexical trait data if one wishes to evaluate the questionnaire evidence for Factor V (or any other factor). I'm not sure about the best way to do this but a convenient first step might be to initially sample only those questionnaire-defined constructs that are explicitly based on or closely linked to the lexical model. A third consideration, is that trait structures need to be evaluated within lower levels of the Big Five trait hierarchy, that is among subdomains or facets of the Big Five.

## Overview

I'll now briefly describe three factor analytic exercises involving questionnaire measures of Factor V traits. Results from these three studies argue, I believe, for an "AIT" approach to organizing the diverse traits and competing conceptions of Factor V. Study 1 examined the factor structure among the 6 NEO Openness facets scales developed by Costa & McCrae (1985), and the 10 HPI Intellectance and School Success subscales or HICs developed by Robert Hogan (1986). These scales provided a theoretically defensible initial sampling of questionnaire-defined traits associated with Factor V. Study 2 replicated Study 1 but expanded the sampling of Factor V questionnaires beyond those of Costa & McCrae and Hogan. Study 3 replicated Studies 1 and 2 but provided a broader sampling of questionnaires to mark the hypothesized A, I, and T factors. Discriminant validity among the AIT factors was evaluated in all three studies by examining AIT factor correlations with scales

operationalizing John Holland's circumplex model of vocational interests. I'll report only the Holland scale correlates from Study 3 because they were essentially identical across the three studies.

There are four findings I wish to highlight. The first is that fundamentally independent A, I, and T factors appeared in every sample, the same finding Martha Glisky has just reported. This is important, I would argue, because the factors represent much more than merely clusters of identical scales, or "bloated specifics" as Cattell would say.

A second finding is that vocational interest correlates of the three AIT factors provide clear evidence of psychological distinctiveness among the AIT factors.

The third and fourth results are, on the other hand, rather supportive of a unitary conception of Factor V. First, correlations among the three AIT factors were consistently weak, but were sufficiently high in all three samples, I believe, to support the notion of a weakly organized, superordinate factor like openness. Finally, while the specific AIT relations to vocational interests argue in favor of distinguishing the factors, the overall *pattern* of these relations supports McCrae & Costa's structural assumptions about openness.

## Study 1

Study 1 is a re-analysis of data from a larger study conducted by Jerry Wiggins and myself about four years ago. Figure 2 shows a two-factor varimax rotated solution for the intercorrelations among NEO and HPI facet measures of Factor V. The sample here is 581 undergraduates.

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Insert Figure 2 about here

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The bottom right cluster contains the aesthetic, affective, and absorptive traits, three of which are from the NEO, two from the HPI, which together define a Factor V

subdomain I'll refer to as absorption or "A". The cluster at the top contains the intellective, traits, all from the from the HPI, which define a Factor V subdomain I'll refer to as intellectance or "I".

The uncircled scales located midway between the A and I clusters have an interesting conceptual similarity deserving brief comment. The midway scales are the curiosity and experience-seeking scales of the HPI, the "ideas" scales from the HPI and the NEO, and the HPI "reading" scale. Their midway location deserves comment because some may prefer a slightly different solution to the one shown here, a solution rotated $45^{o}$ so that one axis passes through this midway cluster. Such a factor would correspond more closely to McCrae & Costa's openness factor than either the A or the I factors here. Note that if one did rotate to such a position, the most univocal markers of such a factor would be scales associated with curiosity, particularly intellectual or epistemic curiosity. The location of the HPI Reading scale there is not inconsistent with this interpretation when one recalls that "reading" items dominate the content of the PRF Need for Understanding Scale, certainly a prototypic epistemic curiosity scale.

Note also that when Jerry Wiggins and myself were developing a 20-item adjective measure of openness, the adjective "philosophical" consistently loaded highest on an openness adjective factor. Perhaps the best single trait descriptive term to represent the middle ground of intellect (I) and absorption (A) is the adjective "philosophical". Finally, consider that it is the poetry items on Costa & McCrae's openness scale that dominate the first, unrotated factor running through the 48 openness items. Poetry may symbolizes best the middle ground of reason (I) and aesthetics (A), the synthesis of truth and beauty that so captivates and motivates the epistemically curious.

The results in Figure 2 provide initial evidence for structuring the facets within Factor V in terms of at least two subdomains, Absorption and Intellectance, or A and I, with motivational traits like curiosity and novelty-seeking located midway between A and

I. Let me now address the possibility of a third major subdomain waiting in the rubble here.

Despite a hefty drop between the second and third eigenvalues in this component analysis, there are good reasons to explore a 3 factor solution. Recall from Martha's presentation, that in a study recently reported in JPSP, she and her colleagues obtained a separate liberalism factor in a factor analysis of Absorption scales and NEO Openness facets (Glisky, Tataryn, Tobias, & Kihlstrom, 1991). The scales marking that liberalism factor were NEO Openness to Values, and NEO Openness to Actions. Neither the A or I factors identified here appear to correspond to the Glisky et al. liberalism factor. It was possible, however, that the Actions and Values scales would split off and define a separate liberalism factor in this sample if more factors were extracted.

A second reason to expect a liberalism-conservatism factor is that conservatism or traditionalism consistently emerges as a sixth or seventh factor "beyond the Big Five" in studies of trait adjectives. For example, traditionalism emerged as a clear sixth factor in McCrae & Costa's (1985) analysis of Big Five adjective markers developed by Goldberg (1983). It also appeared in the comprehensive English language studies of Goldberg (1990), of Peabody & Goldberg (1989), in the Dutch language studies of Hofstee (1977), and is identifiable, but less clearly so, in the German language studies of Angleitner & Ostendorf (1989). In Oliver John's (1989) Big Five prototype study of the 300 ACL items, one cluster of terms judged to be independent or outside of the Big Five was given the label "Traditional Values".

To help fish this factor out of the remaining variance here, and with the consistence lexical evidence for such a factor granting me the fishing license, I added a single extra marker of traditionalism before extracting a 3-factor solution. This extra marker variable was a composite score from self-ratings on three adjectives, "traditional", "conventional", and "unconventional", with the last item reversed scored.

(Scores for these items were lifted from a lengthy adjective scale included in the assessment battery for other purposes).

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Insert Table 1 about here

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Table 1 presents the 3-factor varimax rotated solution for these 17 scales. As you can see, a traditionalism factor emerged very clearly here as the third factor. Loading highly on it were the same two NEO Openness facets, Actions and Values, which defined the liberalism-traditionalism factor in the Glisky et al. study. Also loading highly was the traditionalism adjective scale and the experience or novelty-seeking scale from the HPI. The items on the experience-seeking scale are similar to those on the Openness to Actions scale in that both scales measure a liking for variety, novelty, and change. The negative loading for these scales on traditionalism makes sense when one considers than the most common definition of liberalism-conservatism offered in open-ended responses on national opinion surveys is "openness versus resistance to change". (e.g., Conover & Feldman, 1981; Luttbeg & Gant, 1985).

Let me now quickly turn to Study 2. The purpose of this study was to check whether the AIT factors would retain their integrity when conscientiousness and agreebleness scales were added to the analysis. They might not have for several reasons. One is that Tellegen's traditionalism scale is empirically related to a broad personality factor Tellegen calls "constraint". Constraint corresponds very closely to the Big Five conscientiousness factor. Secondly, adjectives like conservative and traditional frequently load as highly on a conscientiousness factor as they do on an openness factor in trait adjective studies (e.g., Goldberg, 1990).

Study 2, then, tested the independence of A, I and T from conscientiousness and agreeableness. The same 16 scales from Study 1 were administered along with the conscientiousness and agreeableness facet scales from the revised NEO-PI. Three additional AIT marker scales were added as well: shortform versions of Tellegen's

Absorption and Traditionalism scales (Tellegen & Waller, in press), and a two-item scale to measure self-attributed intelligence, labelled SMART. The two SMART items were " "I'm considered exceptionally or unusually intelligent" and "I'm considered extremely "gifted" or talented at academic things". They correlated .56 with each other, and somewhat surprisingly, yielded relatively normal score distributions with means almost exactly at the scale midpoint.

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Insert Table 2 about here

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These scales were jointly factored in a sample of 117 subjects. As can be seen in Table 2, the AIT factors are identical to those found in the first sample. The same AIT markers in Study 1 also defined the AIT factors here. Tellegen's traditionalism scale did have a substantial secondary loading on agreeableness, and the HPI Intellectance HIC "Good Memory" did have a substantial secondary loading on the conscientiousness factor, but overall the AIT factors here are very clearly defined.

Low factor correlations among all five factors here also suggest the AIT factors are distinct, both from one another and from conscientiousness and agreeableness. Only two of the ten factor intercorrelations here exceeded a value of .09. These were a -.16 correlation between the absorption and traditionalism factors, and a .22 correlation between the conscientiousness and intellectance factors. Study 2, then, clearly replicated the AIT factors from Study 1 and somewhat disconfirms the view that traditionalism belongs in conscientiousness.

Let me turn now to the last study, Study 3. In Study 3 a slightly wider selection of AIT related questionnaire scales was administered. Added were a few additional scales judged to be prototypical markers of A, I, and T on the basis of factor analytic and other correlational evidence reported in the literature. Because I had, unfortunately, only one hour of assessment time available to me, I used abbreviated versions of these scales.

Alpha reliabilities for all of these abbreviated scales exceeded .80. (Scale items are listed in the appendix).

Study 3 thus included the 16 NEO and HPI scales used in Studies 1 and 2, it included the three AIT marker scales added in Study 2 (Tellegen Absorption and Traditionalism and the SMART scale), and it included a set of additional scales expected to load very highly on one of the three factors. These extra scales were PRF Sentience (Jackson, 1984), for the A factor, Need for Cognition (Cacioppo, & Petty, & Kao, 1984), for the I factor, and Altemeyer's Right-Wing Authoritarianism scale (Altemeyer, 1981) for the T factor.

Because the Traditionalism factor was somewhat underrepresented in Studies 1 and 2, a second goal of Study 3 was to test run a preliminary set of balanced facet markers of traditionalism. A survey of factor analytic studies in the socio-political attitudes and authoritarianism literatures led to the identification of six initial content distinctions within the domain of traditionalism. Two content facets, one major one, Authority and one minor one, Punitiveness, were considered to be well represented in Study 3 by the Altmeyer scale. Brief, balanced questionnaire scales were assembled for four additional facets: Moral Propriety, Prudishness, Conventionalism, and Religiosity (origins of these items are listed in the Appendix). Alpha reliabilities for all four of these scales exceeded .80.

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Insert Table 3 about here

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Table 3 gives the varimax three-factor solution for the 26 AIT variables in Study 3. The factors are reordered or grouped in the table to make the table easier to read. First note that all the supplemental marker scales introduced in this study loaded very clearly on their intended factors, including all four of the Traditionalism facet markers constructed for this study. Second, note that all scales loading on the traditionalism factor except the Tellegen scale were balanced in their direction of wording, thus

acquiescent responding is not a likely cause here of factor separation of traditionalism scales from absorption and intellectance scales.

Third, note the remarkable degree of simple structure here among 26 different scales, each of which purportedly measure the same common factor, Factor V. In this orthogonal solution, only 9 secondary loadings exceeded a value of .25. Only one of these 9 exceeded a value of .40.

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Insert Table 4 about here

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Of greatest importance, perhaps, is the degree of intercorrelation among these now extremely well-defined A, I, and T factors. The oblique factor correlations among A, I, and T are given in Table 4. Note they are relatively weak, but are larger than in Studies 1 and 2. Thus, in three different samples now, each having slightly different sets of AIT marker variables, the three postulated subdomains of Factor V, absorption, intellectance, and traditionalism always demonstrated some degree of correlation.

Finally note that the factorially complex variables in Study 3 are the same curiosity associated scales that located midway between the A and I factors in Study 1: experience-seeking, and the two "ideas" scales. The Need for Cognition scale, which correlates very highly with measures of curiosity (Olson, 1984), shows a similar pattern of multiple loadings across the three factors.

Let me briefly recap the findings to this point: (1) a clear and interpretable factor structure was identified among the NEO and HPI markers of Factor V; (2) the AIT factors replicated in two additional studies and were clarified by the addition of several widely researched trait scales shown here to be excellent markers of A, I, or T; (3) independence and factorial integrity of the AIT factors was shown with respect to conscientiousness and agreeableness; (4) distinct facets for traditionalism were identified and balanced scales constructed to mark them all loaded highly on the

Traditionalism factor, as did Altmeyer's Right-Wing Authoritarianism scale, Tellegen's Traditional scale and NEO Openness to Values.

With this clear picture of the AIT model firmly in mind, let me now turn to the issue of discriminant validity among the A, I, and T factors. Are A, I, and T so psychologically distinct they should be considered separate Big Five factors, or are they distinct but similar enough in ways that are important enough to justify grouping them into a more superordinate factor like openness? This issue was explored by examining A, I, and T relations with a set of different but relevant constructs, the vocational personality typology of John Holland (1985).

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Insert Figure 3 about here

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Holland's six factor model of vocational interests could be considered the vocational analogue of the lexical Big Five. If, instead of the Oxford English Dictionary, one were to condense the terms in the Dictionary of Occupational Titles into the most superordinate personality-linked groupings, one would likely arrive at something like Holland's Big Six, which are shown in Figure 3. They are arrayed in a circular or hexagon pattern in the figure because that is exactly the pattern of relation usually found among them: scales measuring the six types tend to intercorrelate in the manner of a circumplex (Tracey, & Rounds, in press).

The significance of this structure to the Factor V question is two-fold. First note that two of Holland's Big Six categories, Artistic and Investigative, indicated by the arrows in Figure 3, have a conceptual resemblance to the the A and I factors of the AIT model of Factor V.

Secondly, the structural aspect of Holland's typology, the circumplex model itself, which incidently, is perhaps the best validated circumplex model in the psychological literature, implies that Holland's Artistic and Investigative categories jointly define one end of a common superordinate factor. Even more intriguing, a category labelled

"conventional" jointly anchors the opposite pole of that factor with a second business-related category called "enterprising". Because Holland's model emerged prior to Big Five developments in the trait literature, and emerged prior to the development of Costa & McCrae's openness model of Factor V, the resemblance between this second axis of Holland's circumplex and the structure of Factor V implied by the AIT model is remarkable.

The resemblance between Factor V and Holland's second vocational axis was first noted by Robert Hogan at a symposium exactly 10 years ago (Hogan, 1983), and was investigated in detail by Costa, McCrae & Holland in a 1984 article in the Journal of Applied Psychology. In the Costa et al study, correlations with NEO openness were strongest for the Holland Investigative and Artistic scales, but were accounted for mainly by the NEO Aesthetics facet, which is a marker of A in the AIT model, and the NEO Ideas facet, which is a marker of I. One purpose of Study 3 then, was to see if the AIT conception of Factor V might sharpen or clarify these previously noted relations between Holland's model and Factor V.

Two measures of Holland's typology were administered in Study 3. One was a standard measure, Holland's Vocational Preference Inventory, or VPI. The second was an eight category refinement of the VPI, constructed to provide an optimal circumplex measure of the Holland typology (Trapnell, 1989). Of interest then are the correlations between the A, I, and T factor scores and these two sets of Holland scales.

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Insert Table 5 about here

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Table 5 shows the AIT factor correlations with the VPI scales. First note that the correlations in bold face in Table 5 provide a conceptual replication of the earlier Costa, McCrae, and Holland findings. Second, note the dissimilarities among the correlations in every column of Table 5. Relations between AIT factors and the Holland categories are very distinct. Costa, McCrae, and Holland noted a similar pattern of distinctiveness but

at the level of individual openness facets. The AIT factors represent broader clusters or groupings of Factor V facets, yet distinctive relations with the Holland categories are apparent here as well. One would be hard pressed to defend a general openness factor among absorption, intellectance and traditionalism on the basis of their pattern of relations with Holland's typology. However, I'm going to do just that in a moment.

First let me turn to the last table of results, Table 6, which shows the AIT correlations with the eight octant scales of the JPRF, the circumplex measure of Holland's types. This measure represents a factorially purified pool of Holland VPI items to which were added enough additional items to fill out the Holland hexagon into an eight-scale circumplex. The old VPI scales and the corresponding circumplex versions of those scales correlate very highly, all above .70 except one, the Realistic category, which has a VPI convergent validity of about .6.

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Insert Table 6 about here

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The most important thing about Table 6 is the distinctiveness among the correlations within each column: The AIT factors appear to be quite psychologically distinct, as Glisky and Kihlstrom's hypnotizability findings also suggest. Note that AIT absorption and intellectance factors have opposite correlations with Realistic interests, the variable labelled R in the table. These interests include engineering, electronic technician, and airplane mechanic.

Absorption and intellectance factors also have opposite relations with the JPRF I scale. Two JPRF scales, I and IA, represent Holland's investigative category. Natural science occupations like chemist, geologist, and physicist are grouped in the I scale. Life and social science occupations like biologist, anthropologist, and archeologist are grouped in the IA scale. Note that absorption and intellectance correlate in opposite directions with the JPRF I scale, the one representing natural science occupations.

These two pairs of opposite correlations, those with the JPRF R and I scales are theoretically important, I believe. Hogan's "Math" HIC loaded positively on the intellectance factor but *negatively* on the absorption factor in all three studies reported here. The implicit opposition here between the literary (A) and the mathematical (I) is made explicit in items measuring Cattell's Premsia ("projected emotional sensitivity") or I scale, one of three 16 PF scales that defined openness in Costa & McCrae's first article on trait structure in 1976. Among the items Cattell chose to mark the Premsia factor were item #112, "It would be more interesting to be a philosopher than a mechanical engineer", and item #163, "In school, I prefered (a) English, (b) Mathematics or Arithmetic". The distinction between A and I may be a fundamental one and recalls basic dichotomies such as quantitative versus verbal intelligence, analytic versus global cognitive style, and (now antiquated) conceptions of "masculine" versus "feminine" interests. The distinction also recalls arguments once made in a celebrated essay by C.P. Snow, who advanced the view that academics in sciences and in the arts differed so greatly from each other in values, social outlook, and shared knowledge that it was as if there were "two cultures", forever separate and divided, living side by side in academe. (Snow, 1959).

The evidence presented so far would seem to argue for a splintering of Factor V into three different factors, A, I, and T, and for extending the Big Five model to a "Big Six" or "Big Seven" model, or perhaps a "Big Five plus Little 2" model. Let me conclude with an argument or two for keeping A, I, and T together under one Big Five roof, for retaining Factor V as a many-splendored rather than a many-splintered thing. The first argument is that A, I, and T are invariably correlated with one another. This was the case in all three studies reported here and in the studies reported by Martha Glisky. These correlations are not very large but they are very consistent.

A second and, for me, more compelling reason is the impressive validity Holland and others have established for the circumplex model of vocational interests. The circumplex is defined in part by a very strong bipolar factor contrasting arts and science

occupations with business occupations. The factor provides important evidence, I believe, of some kind of psychological unity among aesthetic (A) and intellective (I) interests. Is there any evidence, then, linking the third remaining subdomain of Factor V, traditionalism, to this broad, robust dimension of interests?

In a paper presented at an APA symposium exactly two decades ago, David Campbell and Jack Rossman reported the development of a Liberalism-Conservatism key for the Strong Vocational Interest Blank. Using a simple self-rating on Liberalism-conservatism combined with political party affiliation, Campbell & Rossman identified which Strong items discriminated liberals from conservatives, cross-validated the resulting scale, and then obtained liberalism-conservatism mean scores for all the occupational groups in the Strong archives. Among the most liberal occupations were artist, author-journalist, biologist, and psychologist. Among the most conservative were banker, accountant, and sales manager. Clearly this pattern parallels the locations of occupations along the second axis of the Holland circumplex.

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Insert Figure 4 about here

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Figure 4 is an empirical factor plot of the Holland circumplex scales that were used in this study. The two JPRF scales most related to intellectance and absorption, the Investigative and Artistic scales, are indicated by the lines extending toward the bottom of the figure. The relevant pattern of findings from the Campbell and Rossman study is indicated by the labels "conservative" and "liberal" shown at the top and bottom of the figure, respectively. Persons employed in occupations located at the top of the circumplex, such as sales and accounting, tend to be conservative. Persons employed in occupations located at the bottom of the figure such as artist, anthropologist, and biologist, tend to be liberal.

Thus, at some very broad level, absorption and intellectance line up with liberalism on the same side of a superordinate personality dimension, that is, in a

manner highly consistent with Costa & McCrae's openness model of Factor V. The openness construct does not, however, embrace the full range of Hogan's intellectance subdomain, nor does it sufficiently embrace the full range of traits associated with openness vs resistence to change---liberalism vs conservatism. I believe the AIT model of Factor V provides a useful way to organize within the Big Five the facets of openness, the HICs of intellectance, and the long-ignored "sixth" factor in lexical studies of trait structure.

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Table 1

Study 1: Varimax solution for 17 Factor V scales

| | A | I | T |
|---|---|---|---|
| NEO-OPEN.Aesthetics | **79** | | -27 |
| HPI-Culture | **74** | | -20 |
| HPI-Reading | **60** | | |
| NEO-OPEN.Feelings | **59** | | |
| HPI-Curiosity | **50** | | |
| NEO-OPEN.Fantasy | **44** | | -37 |
| HPI-Math | -31 | **66** | |
| HPI-Games | | **66** | |
| HPI-Science | | **62** | -26 |
| NEO-OPEN.Ideas | **41** | **56** | -31 |
| HPI-Memory | 35 | **53** | 20 |
| HPI-Ideas | 26 | **44** | -29 |
| HPI-School | 20 | **43** | 18 |
| NEO-OPEN.Actions | -26 | | **-70** |
| Tradit. adjectives | | | **68** |
| HPI-ExperienceSkg | | 30 | **-63** |
| NEO-OPEN.Values | -27 | | **-57** |

Note: N= 581. Decimals omitted. Absolute loadings less than .20 omitted. Absolute loadings .40 or greater are printed in boldface.

Table 2

Study 2: 5 factor varimax solution for conjoint analysis of 19 AIT markers and NEO-PIR Agreeableness and Conscientiousness facet scales

| | | | A | I | T |
|---|---|---|---|---|---|
| | I | III | II | IV | V |
| CONSC.discipline | **82** | | | | |
| CONSC.achievement | **76** | | | | |
| CONSC.competetence | **73** | | | | |
| CONSC.duty | **71** | | | | |
| CONSC.order | **69** | | | | 34 |
| CONSC.deliberation | **60** | | | | |
| HPI-Memory | **46** | | | **47** | |
| AGREE.straightforw | | **79** | | | |
| AGREE.meekness | | **74** | | | |
| AGREE.trust | | **73** | | | |
| AGREE.modesty | | **65** | | | |
| AGREE.altruism | 34 | **63** | 30 | | |
| AGREE.tendermind | | **57** | 37 | | |
| NEO-OPEN.Aesthetics | | | **85** | | |
| MPQ-Absorption | | | **75** | | |
| HPI-Culture | | | **72** | | |
| HPI-Reading | | | **71** | | -37 |
| NEO-OPEN.Feelings | | | **68** | | |
| NEO-OPEN.Fantasy | | | **40** | | |
| HPI-Games | | | | **68** | |
| HPI-Science | | | | **68** | |
| HPI-Curiosity | | | | **67** | |
| NEO-OPEN.Ideas | | | | **62** | -39 |
| SMART | | | | **59** | |
| HPI-Ideas | 34 | -32 | | **54** | |
| HPI-Math | | | -38 | **44** | |
| HPI-School | 32 | | | 36 | |
| NEO-OPEN.Values | | | | | **-67** |
| NEO-OPEN.Actions | | | | | **-64** |
| HPI-ExperienceSkg | | | 37 | 37 | **-48** |
| MPQ Traditionalism | | **47** | | | **48** |

Note: N= 117. Decimals omitted. Absolute loadings less than .30 omitted. Absolute loadings .40 or greater are printed in boldface.

Table 3

Study 3: Varimax rotated solution for 26 Factor Five scales

| | A | I | T |
|---|---|---|---|
| NEO-OPEN.Aesthetics | **86** | | |
| MPQ-Absorption | **82** | | |
| HPI-Culture | **77** | | |
| PRF-Sentience | **76** | 25 | |
| NEO-OPEN.Feelings | **70** | | |
| NEO-OPEN.Fantasy | **68** | | -24 |
| HPI-Reading | **44** | | |
| HPI-Science | | **72** | |
| HPI-Curiosity | | **69** | |
| NEO-OPEN.Ideas | **46** | **69** | |
| Need for Cognition | 30 | **67** | -23 |
| SMART | | **60** | |
| HPI-School | | **58** | |
| HPI-Math | -27 | **56** | |
| HPI-Ideas | 37 | **55** | |
| HPI-ExperienceSkg | **40** | **55** | -25 |
| HPI-Memory | | **51** | |
| HPI-Games | | **50** | |
| NEO-OPEN.Actions | | **40** | -39 |
| MPQ-Traditionalism | | | **88** |
| Moral Propriety | | | **81** |
| RWA-Authoritarianism | -27 | | **73** |
| Prudishness | | -20 | **71** |
| Conventionality | | | **69** |
| NEO-OPEN.Values | 25 | 31 | **-67** |
| Religiosity | | | **63** |

Note: N= 202. Decimals omitted. Absolute loadings less than .20 omitted. Absolute loadings .40 or greater are printed in boldface.

Table 4

Factor Intercorrelations, Study 3

| | A | I |
|---|---|---|
| I | 30 | |
| T | -22 | -27 |

Note: N= 202.

Table 5

Correlations between AIT factor scores and the vocational scales of Holland's Vocational Preference Inventory

| | VPI Scales | | | | | |
|---|---|---|---|---|---|---|
| | R | I | A | S | E | C |
| AIT Factors | | | | | | |
| A | -02 | 11 | **59** | **41** | 06 | -22 |
| I | **27** | **40** | 09 | -05 | 01 | -02 |
| T | -01 | -18 | -15 | -07 | 00 | 10 |

Note: Decimals omitted. N= 202. VPI labels are Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). Absolute correlations greater than .25 printed in boldface. Absolute correlations greater than .12 significant at $p < .05$.

Table 6

Correlations between AIT factor scores and JPRF circumplex version of Holland scales

| | JPRF Octant version of Holland Scales | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | R | I | IA | A | S | ES | E | C |
| AIT Factors | | | | | | | | |
| A | **-32** | -15 | **29** | **60** | **29** | 20 | -17 | **-37** |
| I | **35** | **55** | **33** | 07 | -09 | -05 | -12 | 07 |
| T | 10 | -02 | -15 | -12 | 03 | -09 | 09 | 09 |

Note: Decimals omitted. N= 202. JPRF labels are Realistic (R), Investigative (I), Investigative-Artistic (IA), Artistic (A), Social (S), Enterprising-Social (ES), Enterprising (E), and Conventional (C). Absolute correlations .25 or greater presented in boldface. Absolute correlations greater than .12 significant at $p < .05$.

I II III IV

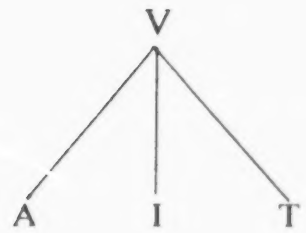


Figure 1. A-I-T Model of Factor V

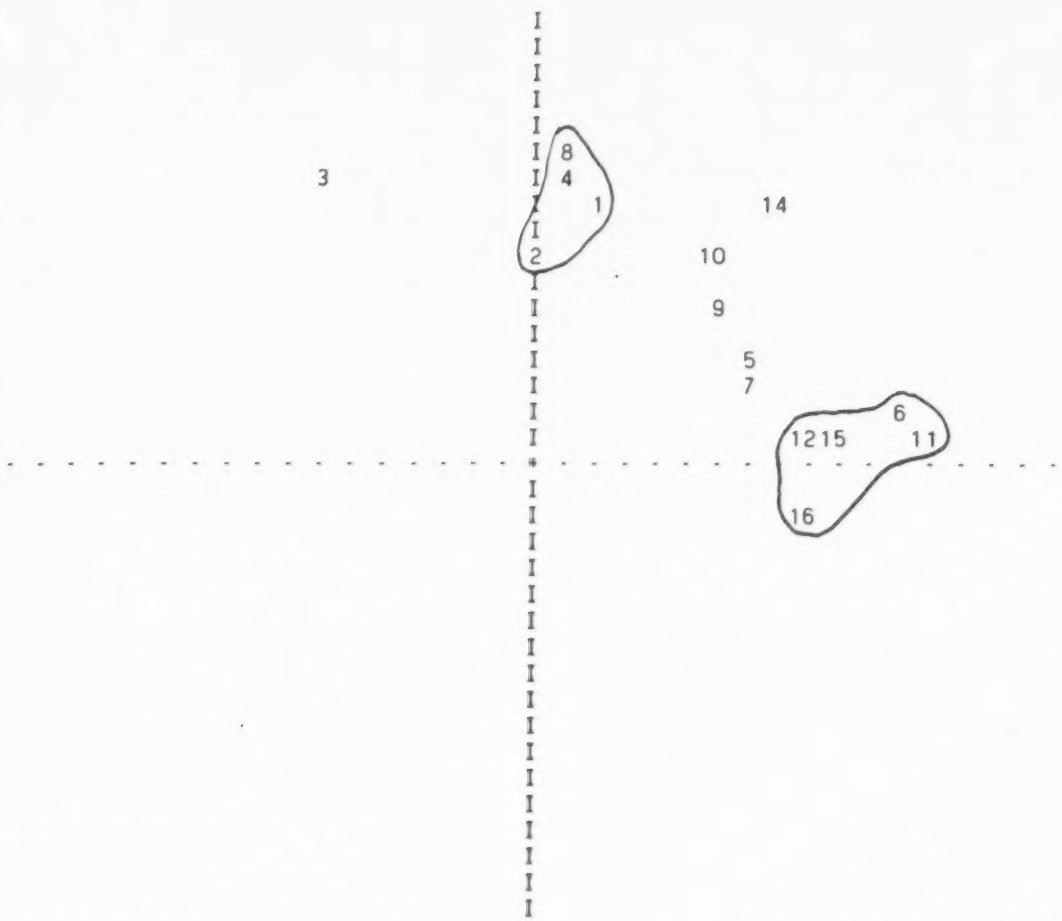


Figure 2 Two-factor varimax solution for intercorrelations among NEO and HPI Factor V scales, n = 581.

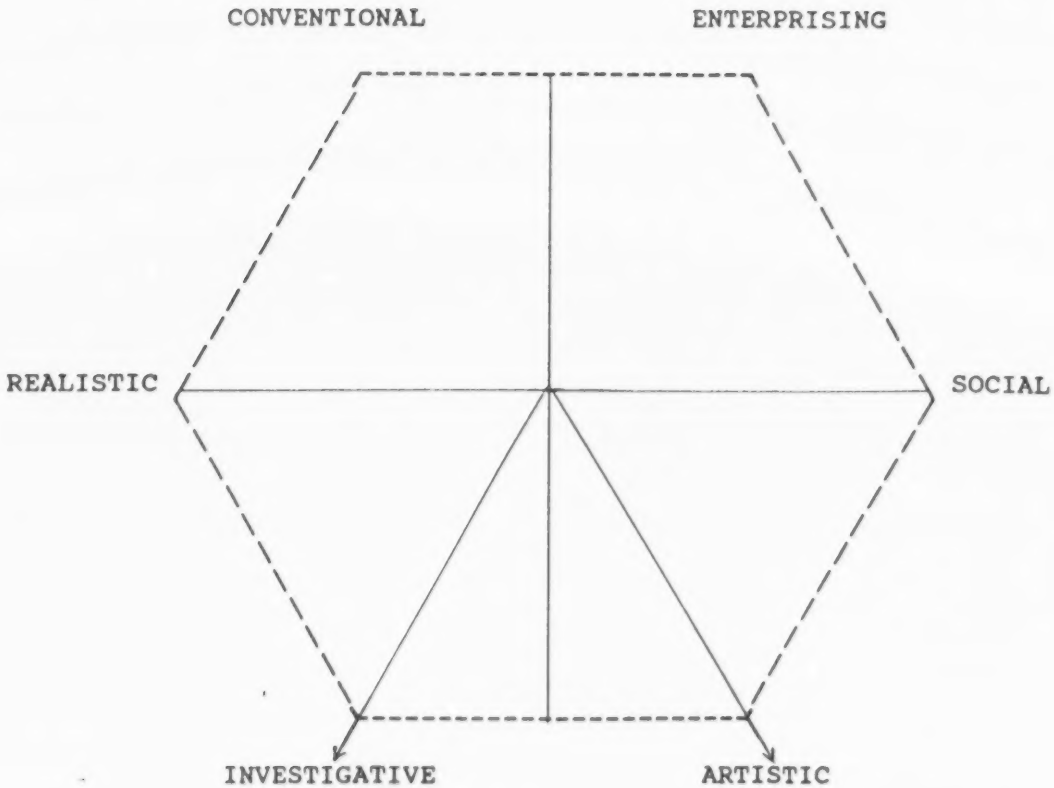


Figure 3. Holland's hexagonal model of vocational personality types

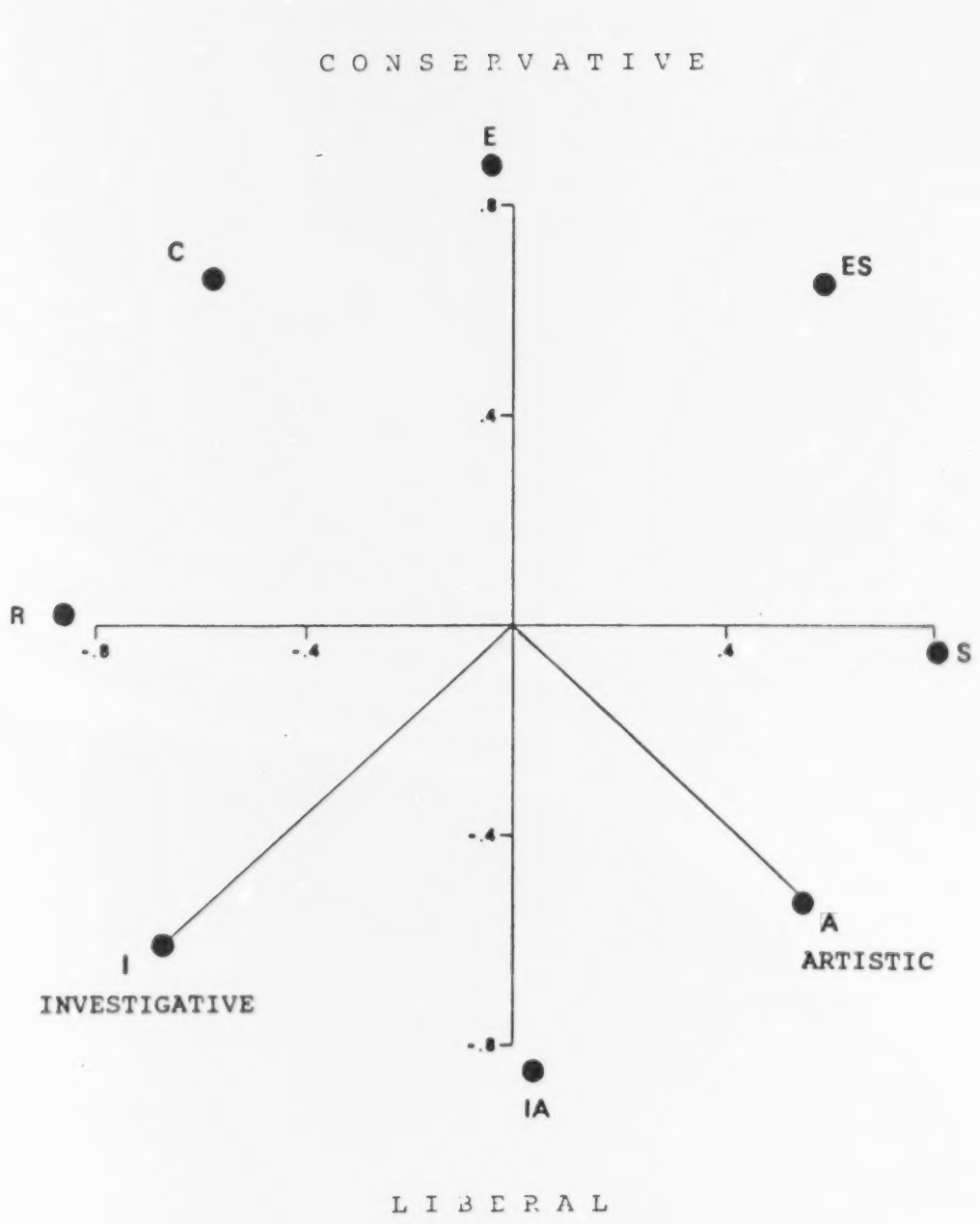
CONSERVATIVE
E
.8
C
ES
.4
R
-.8
-.4
.4
S
-.4
A
ARTISTIC
I
INVESTIGATIVE
-.8
IA
LIBERAL

Figure 4

# APPENDIX

## ITEM CONTENT OF ABBREVIATED AIT MARKER SCALES, AND OF TRADITIONALISM FACET SCALES CONSTRUCTED FOR STUDY 3

MPQ ABSORPTION (12 ITEM SHORTFORM)

MPQ 137 It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whole state of consciousness has somehow been temporarily altered.
MPQ 235 Some music reminds me of pictures or changing color patterns.
MPQ 146 Different colors have distinctive and special meanings for me.
MPQ 207 When listening to organ music or other powerful music I sometimes feel as if I am being lifted into the air.
MPQ 200 I often take delight in small things (like the five-pointed star shape that appears when you cut an apple across the core or the colors in soap bubbles).
MPQ 260 The sound of a voice can be so fascinating to me that I can just go on listening to it.
MPQ 280 Sometimes thoughts and images come to me without the slightest effort on my part.
MPQ 014 I can be greatly moved by eloquent or poetic language.
MPQ 130 The crackle and flames of a wood fire stimulate my imagination.
MPQ 092 Sometimes I experience things as if they were doubly real.
MPQ 058 If I wish I can imagine or daydream some things so vividly that they hold my attention as a good movie or story does.
MPQ 076 I sometimes "step outside" my usual self and experience an entirely different state of being.

PRF SENTIENCE (12 ITEM SHORTFORM)

PRF 017 The motion of water in a river can almost hypnotize me.
PRF 105 Sometimes I feel like stepping into mud and letting it ooze between my toes.
PRF 237 I think that my sense of touch is more sensitive than that of most people.
PRF 281 I like to run through heaps of fallen leaves.
PRF 193 Certain pieces of music remind me of pictures or moving patterns of colour.
PRF 325 I enjoy the feeling of mist and fog.
PRF 171 I don't get any particular enjoyment from sitting in the sun.
PRF 083 I have never seen a statue that reminded me of a real person.
PRF 039 I rarely notice the texture of a piece of clothing.
PRF 259 I could not possibly identify flowers just by their fragrance.
PRF 347 I rarely sit and watch the water at a beach or stream.
PRF 127 I don't care whether I drink water from a fine glass or from a paper cup.

"SMART" SCALE ITEMS

I'm considered exceptionally or unusually intelligent.
I'm considered extremely "gifted" or talented at academic things.

MPQ TRADITIONALISM (16 ITEM SHORTFORM)

MPQ 009 The best way to achieve a peaceful world is to improve people's morals.
MPQ 230 It is a pretty callous (unfeeling) person who does not feel love and gratitude toward his/her parents.
MPQ 121 I very much dislike it when someone breaks accepted rules of good conduct.
MPQ 030 As young people grow up they ought to try to carry out some of their rebellious ideas instead of just settling down.
MPQ 262 Strict discipline in the home would prevent much of the crime in our society.
MPQ 285 High moral standards are the most important thing parents can teach their children.
MPQ 253 I don't like to see religious authority overturned by so-called progress and logical reasoning.
MPQ 167 People should observe moral laws more strictly than they do.
MPQ 063 Higher standards of conduct are what this country needs most.
MPQ 220 Whenever I decide anything I make it a point to refer to the basic rules of right and wrong.
MPQ 020 I am always disgusted with the law when a criminal goes free because of the arguments of a clever lawyer.
MPQ 275 I am not at all sorry to see many of the traditional values change.
MPQ 299 I admire my parents in all important respects.
MPQ 155 My parents' ideas of right and wrong have alway proved best.
MPQ 144 The church has outgrown its usefulness and should be radically reformed or done away with.
MPQ 053 I am very religious (more than most people are).

BEST COPY AVAILABLE

ALTEMEYER RIGHT-WING AUTHORITARIANISM SCALE (20 ITEM SHORTFORM)

RWA 001 Laws have to be strictly enforced if we are going to preserve our way of life.
RWA 019 The courts are right in being easy on drug offenders. Punishment would not do any good in these cases.
RWA 020 If a child starts becoming a little too unconventional, his parents should see to it he returns to the normal ways expected by society.
RWA 021 Being kind to loafers and criminals will only encourage them to take advantage of your weakness, so it's best to use a firm, tough hand when dealing with them.
RWA 004 Our customs and national heritage are the things that have made us great, and certain people should be made to show greater respect for them.
RWA 005 Capital punishment should be completely abolished.
RWA 006 National anthems, flags, and glorification of one's country should all be de-emphasized to promote the brotherhood of all men.
RWA 007 The recent public disorders all show we have to crack down harder on deviant groups and troublemakers if we are going to save our moral standards and preserve law and order.
RWA 009 Our prisons are a shocking disgrace. Criminals are unfortunate people who deserve much better care, instead of so much punishment.

RWA 023 Homosexuals are just as good and virtuous as anybody else, and there is nothing wrong with being one.
RWA 010 Obedience and respect for authority are the most important virtues children should learn.
RWA 014 It may be considered old-fashioned by some, but having a decent respectable appearance is still the mark of a gentleman and, especially, a lady.
RWA 002 People should pay less attention to the bible and the other traditional forms of religious guidance, and instead develop their own personal standards of what is moral or immoral.
RWA 011 Organizations like the army and priesthood have a pretty unhealthy effect upon men because they require strict obedience of commands from supervisors.
RWA 012 One good way to teach certain people right from wrong is to give them a good stiff punishment when they get out of line.
RWA 013 Youngsters should be taught to refuse to fight in a war unless they themselves agree the war is just and necessary.
RWA 015 In these troubled times laws have to be enforced without mercy, especially when dealing with the agitators and revolutionaries who are stirring things.
RWA 017 Young people sometimes get rebellious ideas, but as they grow up they ought to get over them and settle down.
RWA 016 Athiests and others who have rebelled against the established religions and are no doubt every bit as good and virtuous as those who attend church regularly.
RWA 018 Rules about being "well-mannered" and respectable are chains from the past that we should question very thoroughly before accepting.

MORAL PROPRIETY
I try to preserve strict moral standards.
I could never approve of unlawful or unethical behavior.
I try to act in proper and appropriate ways at all times.
Being moral and law-abiding at all times is very important to me.
Moral standards in some countries are not strict enough.
The respectability of people's conduct is not important to me.
Most immoral behavior is harmless and people shouldn't become concerned about it.
Public concerns about morality are usually misguided or exaggerated.
Sexual morality should be left completely up to individuals, not to public authorities.
I like a very relaxed permissive approach to morality.

PRUDERY (based on Fisher et al., 1988, and Hudson et al, 1983)
There is too much sexual freedom today.
Movies today are much to sexually explicit.
I think many people engage in too much sex.
I think sex is best reserved for marriage.
I think erotic or sexually explicit material is disgusting.
Thoughts about sexual acts with more than one person don't disgust me.
I would enjoy watching certain types of erotic or sexually explicit movies.
Thoughts about engaging in unusual sex practices are very arousing.
Masturbation is a really enjoyable, healthy activity.
Laws should never prohibit or restrict the private sexual acts of consenting adults.

RELIGIOSITY (based on Feagin, 1964, Gorsuch & Venable, 1983, and Hoge, 1972)
I would attend a religious place of worship more than once a week if I could.
I often have a strong sense of God's presence around me.
I try to spend some time each day in private prayer or worship.
My whole approach to life is centred on my religious beliefs.
I always try to base my views of right and wrong on God's teachings.
Frequent religious worship or devotion isn't important to me.
I'm not religiously devout.
There are many more important things in my life than my religion.
Religion doesn't influence my everyday life that much.
Religion doesn't influence my moral beliefs very much.

CONVENTIONALISM
My views are conservative.
Old-fashioned values are very appealing to me.
I really like conventional values.
I prefer to have traditional attitudes.
I very much prefer modern values over old-fashioned values.
I believe conventional values are somewhat backward and out of touch with today's world.
Traditional values don't appeal to me.
My views are extremely liberal, rather than conservative.